THE

ONTARIO WATER RESOURCES

COMMISSION

WATER QUALITY SURVEY

of the

LITTLE CATARAQUI CREEK

May, 1965

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Report on

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Division of Sanitary Engineering

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WATER QUALITY SURVEY

INTRODUCTION

On May 11 last a water quality survey was carried out on Little Cataraqui Creek. The survey was requested by Dr. S. D. Lash, Chairman of the Little Cataraqui Creek Redevelopment Committee.

METHOD OF SAMPLING AND COMMISSION'S OBJECTIVE FOR SURFACE WATER QUALITY

Samples were obtained on the creek and major tributaries at sufficient points to give a representative picture of water quality in the watershed. All the samples were obtained at road bridges or culverts. Bacteriological samples were obtained at all points and sanitary chemical samples at all points except for the following two:

CCW-5.4 - West Branch Highway 33,-1,000 feet west of Frontenac High School

CC-4.8 - McAdoos Lane

The sampling point numbers are designated "CC" for Little Cataraqui Creek and "CCW" for the West Branch of Little Cataraqui Creek. The number following the letters is the mileage as measured from the mouth of the creek. The sample locations are noted on the accompanying map.

The following is an explanation of the significance of laboratory analyses.

A. Bacteriological Examination

The membrane filter technique is used to obtain a direct enumeration of coliform organisms. These organisms are normal inhabitants of the intestines of man and other warm-blooded animals. They

are always present in large numbers in sewage and are generally minimal in other water pollutants.

The results of the examinations are reported as "M.F. Coliform Count per 100 ml".

The Commission's objective for stream sanitation is a coliform density of not greater than 2,400 organisms per 100 ml.

B. Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD):

Biochemical oxygen demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic matter in the water. The completion of the laboratory test requires five days, under the controlled incubation temperature of 20°C.

The Commission's objective for stream water quality is an upper limit of 4 ppm.

Solids:

The value for total solids, expressed in parts per million (ppm), is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analyses in regard to stream water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish.

Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity:

Turbidity is caused by the presence of suspended matter such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and results are reported in "Silica Units".

Colour:

The colour intensity is reported in apparent colour units. The colouration of water may result from contact with natural organic matter or chemical substances and/or industrial wastes. In order to determine if man-made pollution is present, it is necessary to establish the natural colour concentration of the watercourse.

Chloride:

Chlorides are naturally present in water in varying quantities depending on the nature of the watershed. Domestic sewage and industrial wastes also contain varying amounts of chloride. The average concentration of this material in domestic sewage is 80 parts per million. As for colour, it is necessary to establish the natural chloride concentration of the watercourse.

Free Ammonia and Nitrate:

These are the first products of the decomposition of organic matter. The organic matter could be material such as aquatic plants or domestic or industrial wastes. It is generally necessary to use other analyses along with these in order to establish the presence of pollution.

Anionic Detergents as ABS:

This is an indication of the commonly used material for washing purposes. Its presence in any concentration is an indicator of man-made waste.

SAMPLE RESULTS

The results of samples obtained at the time are noted below.

Sample Number	BOD	Turbidity Units	Apparent Colour Units	Chloride as Cl.	Anionic Detergents as ABS
CC-0.0	3.9	2.5	25**	28	0.1
CCW-5.4	-	-	-	-	
CCW-4.4	1.4	2.6	***	41	0.1
CCW-3.7	2.5	34	***	***	***
CC-1.4	3.2	6.5	***	38	0.0
CC-2.3	8.0	8.0	25	32	0.0
CC-2.8	1.1	6.0	***	***	***
CC-4.8	-	-	-	-	-
CC-6.2	0.6	2.5	***	13	0.1

N I T R O G E N A S N

Sample Number	Free Ammonia	Total Kjeldahl	Nitrite	Nitrate	Coliforms per 100 ml. Membrane Filter
CC-0.0	0.13	0.90	0.0	0.0	6
CCW-5.4	-	-	-	-	1,300
CCW-4.4	0.05	0.40	0.0	0.0	1,700
CCW-3.7	***	0.90	***	0.2	2,400
CC-1.4	0.20	1.70	0.0	tr.	320
CC-2.3	0.05	1.70	0.0	tr.	14,000
CC-2.8	0.13	0.65	0.0	0.0	200
CC-4.8	-	-	-	-	80
CC-6.2	0.08	0.46	tr.	tr.	70

** Test performed on settled sample.
*** Sample exhausted - Test could not be performed.

SAMPLE NUMBER DESCRIPTION

CC-0.0	Cataraqui Creek - at mouth
CCW-5.4	Cataraqui Creek - West Branch, Highway 33, 1,000 feet west of Frontenac High School
CCW-4.4	Cataraqui Creek - West Branch at Days Road
CCW-3.7	Cataraqui Creek - West Branch at Highway 33
CC-1.4	Cataraqui Creek - at Highway 33
CC-2.3	Cataraqui Creek - at Highway 2
CC-2.8	Cataraqui Creek - Counter Street 200 feet east of railway
CC-4.8	Cataraqui Creek - McAdoos Lane
CC-6.2	Cataraqui Creek - Perth Road

CC-2.3

The foregoing results indicate that the greatest degree of pollution occurs at Highway No. 2 or Princess St. This is discharged to the creek via the City of Kingston storm sewer which parallels Princess St. There was a definite grey colour to the flow coming from this storm sewer. A subsequent investigation indicated that the grey coloured material was coming from the Aluminum Company of Canada Limited.

In addition to the grey coloured material, there was a small concentration of dark coloured oil present in the storm sewer flow. It was reported by local fishermen that large concentrations of oil had been noted in the downstream end of the creek during the previous month. The source of this oil was not determined.

The high coliform concentration at this point indicates the possibility of domestic sewage in the storm sewer.

CCW-3.7, CCW-4.4 and CCW-5.4

The relatively high coliform counts at these points also indicate the possibility of domestic sewage entering the creek. The source of this could be inadequately treated sewage from private sewage disposal systems in the Township of Kingston.

CC-0.0

This point is at the mouth of the creek and it is difficult to get a representative sample due to dilution from Cataraqui Bay and the St. Lawrence River. The BOD at this point is lower than at Highway No. 2. This could be due to dilution from the tributaries, Cataraqui Bay or the natural recovery of the stream. The coliform concentration is significantly low in view of the upstream pollution.

This could be occasioned by natural purification or a toxic material

CC-1.4

This sample obtained at Bath Road also indicated an improvement in quality to that noted for the west branch and in the main stream at Highway No. 2.

CC-2.8, CC-4.8 and CC-6.2

These samples indicate that the sanitary quality of the creek upstream of Counter Street is relatively good. The one exception is the presence of detergent in the sample obtained at Perth Road. The concentration of this material is at the lower end of the sensitivity for this test. In view of this and the limited development upstream from this point, its significance can be questioned.

SUMMARY

This investigation indicates that pollution is present in the Little Cataraqui Creek at Highway No. 2 and in the west branch of Little Cataraqui Creek at Bath Road and Day's Road. The pollution at Highway No. 2 enters via a City of Kingston storm sewer. Part of this pollution is attributed to wastes from the Aluminum Company of Canada Limited. The origin of the dark coloured oil and the appreciable coliform concentration has yet to be determined.

The high coliform concentrations in the west branch of the creek is likely due to the drainage of inadequately treated sewage from private disposal systems. This problem will be rectified when the Township of Kingston extends its sanitary sewers throughout the entire area and private sewage disposal systems are abandoned.

The sanitary quality of the creek upstream from Counter Street is relatively good.

RECOMMENDATIONS

(1) The City of Kingston should determine the sources of pollution to the noted storm sewer.

(2) The Aluminum Company of Canada Limited should direct all contaminated flows to the city's sanitary sewers.

(3) The Township of Kingston should extend its sanitary sewer system throughout this area and require all households and establishments to connect thereto.

All of which is respectfully submitted,

District Engineer: J. K. Theil

Approved by J.R. Barr, Assistant Director

Prepared by: L. South

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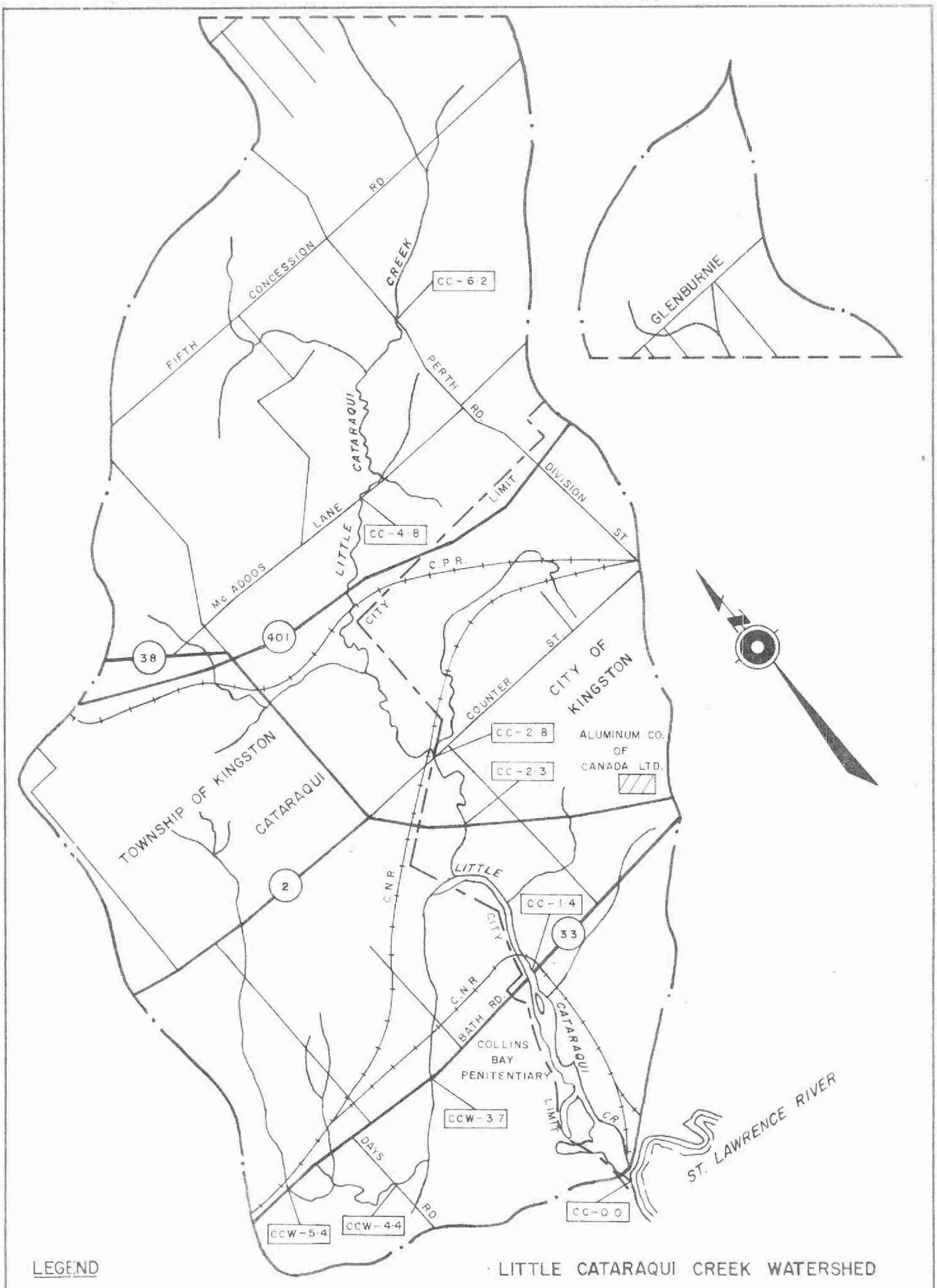

LEGEND

CC-2·3 - SAMPLING POINT SHOWING STREAM AND MILEAGE

LITTLE CATARAQUI CREEK WATERSHED

WATER QUALITY SURVEY

SCALE - 1:50,000

DATE - JUNE, 1965

DRAWING No: 65-81